# Marijuana: Killer on the Highway

Marijuana is the most common illicit drug of abuse. In Montana over 12% of persons age 12 or older have used marijuana during the past month. (NSDUH) 80-100% of chronic marijuana users drive under the influence of marijuana. 70% of them do not believe that impairment from marijuana causes traffic crashes. (Terry & Wright, 2005) 21-15 year old drivers were 2.5 times more likely to drive under the influence of marijuana than alcohol. (Ferguson, & etal., 2008)

Data from the Fatality Analysis Reporting System (FARS) for Montana passenger vehicle drivers in fatal crashes shows marijuana use to be 13% or higher in the years 2007, 2008, and 2009. In 2009 marijuana use contributed to the deaths of 39 people on Montana highways. (Crancer, 2010)

The marijuana plant contains several substances with psychoactive properties. Tetrahydrocannabinol (THC) is the drug which causes the primary "feel good" and impairing effects. Absorption of THC is rapid and most efficient through inhalation with onset in seconds, peak 3-10 min, and 10-35% bioavailability [variability based on skill and smoking technique]. Sublingual absorption is also rapid with peaks reaching 14 ng/ml. Oral absorption is slow and erratic with peak in 1-2 hours , reaching 6 ng/ml, with only 6-7% bioavailable. Peak effects are later than peak blood levels because brain levels are still rising as blood levels fall. THC has a very large volume of distribution due to strong binding to tissues. The volume of distribution increases from 3L in a new user to 236L in a chronic user as the fatty tissues soak up the THC. (Grotenhermen, 2003) With the same dose of smoked marijuana maximum blood levels of THC in occasional users reached 49 ng/ml vs 121 ng/ml in chronic heavy users. Blood THC levels 8 hours later are not detectable in occasional users but are still 3.5 ng/ml in chronic users. 8 hours after placebo chronic users still have 3.3 ng/ml. (Toennes & etal., 2008) THC moves in and out of the brain easily and higher concentrations are found in the brain cortex than in blood. THC crosses the placenta and passes into breast milk. In heavy users the milk-to-plasma ratio can be as high as 8:1. This can result in an infant ingesting the weight adjusted dose equivalent of one joint in one feeding. (Djulus & etal., 2005) THC is metabolized in the liver through the cytochrome P450 complex. A high degree of first pass metabolism reduces bioavailability after oral administration. The major metabolites are THC-COOH, which has very little psychoactivity, and 11-OH-THC which is also psychoactive. There is slow equilibration with plasma & tissue and slow rediffusion of THC from body fat and other tissues into blood. The ½ life of THC has wide variability among individuals and is longer in chronic users than acute users. In acute users estimated ½ life is 25-36 hours and ½ life of THC-COOH is 3-5 days. THC-COOH may be detected in the urine for several weeks in chronic users.

Scientific studies of smoked marijuana are difficult to design due to wide variability in product quality and subject smoking technique. Pharmacokinetics and pharmacodynamics have been measured in occasional and chronic users, and these studies show wide intrasubject as well as intersubject differences. (Toennes & etal., 2008) Studies to measure impairment from drugs have three basic designs: 1) laboratory measurements of reaction time, calculations skill, and decision making, 2) closed course driving or computerized simulators, and 3) epidemiologic studies of drug use in crashes.

1) Laboratory studies show correlation between blood THC levels and impairment in function. At THC levels of 2-5 ng/ml critical tracking performance was equal to breath alcohol concentration (BAC) ≥ 0.05%. At THC levels >5 ng/ml performance on three tasks showed impairment greater than BAC > 0.10%. (Ramaekers & etal., 2006)

2) Driving on a test track after administering low doses of THC orally showed obvious impairment, with the tracking test most significant [keeping the car within the driving lane.] (Menetry & etal., 2005) Experienced pilots in a flight simulator showed decrements in performance 24 hours after a single dose of smoked marijuana. (Leirer, 1991)

3) To demonstrate risk of death in motor vehicle crashes a study must have 3 characteristics: 1) adequate power—enough crashes studied, 2) blood THC levels, and 3) culpability/responsibility analysis. There are two studies which meet these criteria and both show significant risk of death for a driver under the influence of marijuana. THC ≥ 5ng/ml is associated with relative risk of death of 6.6. (Drummer & etal., 2003) THC ≥ 1ng/ml is associated with relative risk of death of 2.3. (Biecheler & etal., 2008)

There are two aspects of impairment in driving: environment and driver. To drive safely is a complex interaction of these. A driver who may be able to drive safely during a summer day from home 2 blocks to the grocery store may be very unsafe at night on a two lane slushy road going 60 mph. It requires every bit of possible skill to safely avoid a hazard like deer, black ice, and other unsafe drivers. The smallest amount of an impairing drug may be too much, contributing to a driver's inability to avoid a crash, or contributing to the driver's responsibility for a crash. This is the basis of making the legal levels of impairing drug, "perse", at level of detection--any amount is too much.

For alcohol law makers have decided that an increase in crash risk is acceptable--low levels of alcohol impairment are OK. The Department of Transportation has decided that the relative risk to public safety is significant at 0.02% BAC (commercial driver may not drive), and at 0.04% a commercial driver will lose his/her commercial drivers' license. Most other countries in the world have perse limit of 0.04% to 0.05%. To answer the question, "What level of increased crash risk is acceptable?", one strategy might be to compare the increased crash risk for alcohol to the increased crash risk for other drugs. But it is difficult to compare alcohol to THC because alcohol has zero order (simple) pharmacokinetics; THC has complex pharmacokinetics. One study showed that THC at >5 ng/ml had the same fatal crash risk as BAC >0.15%. (Drummer & etal., 2003) The same study showed that THC plus alcohol >0.05% had risk 2.9 times greater that BAC >0.05% alone.

In Montana we have three different rights which must be balanced: 1) the constitutional right of privacy, "The right of individual privacy is essential to the well-being of a free society and shall not be infringed without the showing of a compelling state interest," [1] 2) the employer and employee right to a safe workplace,[2] and 3) the public right to safe highways.[3] The state has shown compelling evidence that an individual does not have the right to endanger the safety of the public. The individual right to be impaired is trumped by the public right to be protected from unsafe actions of the impaired person. The limitations of the Montana Marijuana Act[4] include: (1) This chapter does not permit: (a) any person to operate, navigate, or be in actual physical control of any motor vehicle, aircraft, or motorboat while under the influence of marijuana... (2) Nothing in this chapter may be construed to require:...(b) an employer to accommodate the medical use of marijuana in any workplace. A "medical" marijuana user does not have a "get out of jail free" card for illegal acts which endanger the public.

Marijuana: NOT legal, NOT medicine, NOT in the workplace, NOT around children, NOT on the highway.

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[1] Montana Constitution, Section 10
[2] Montana Code Annotated 39-71-1502
[3] Montana Code Annotated 61-2-102
[4] Montana Code Annotated 50-46-205

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# HB 43 Amendments

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15 (3) Subsection (2) does not apply to:
16 (a) use of a lawful product, ~~including the medical use of marijuana as defined in 50-46-102,~~ that:
17 (i) affects in any manner an individual's ability to perform job-related employment responsibilities or the
18 safety of other employees; or

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(4) (a)~~Except as provided in subsection (4)(b),~~ an employee is not eligible for benefits otherwise
1 payable under this chapter if the employee's use of alcohol or drugs ~~not prescribed by a physician~~ is ~~the major~~
2 a contributing cause of the accident. However, if the employer had knowledge of and failed to attempt to stop the
3 employee's use of alcohol or drugs, this subsection does not apply.
~~4 (b) An employee who has received written certification, as defined in 50-46-102, from a physician for the~~
~~5 medical use of marijuana is eligible for benefits payable under this chapter, subject to the limitations of [section 5].~~

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(b) an employer to accommodate the medical use of marijuana in any workplace ~~in the course and scope~~
~~16 of employment.~~
17 (i) the medical use of marijuana by an employee; or
18 (ii) an employee who is under the influence of marijuana because of the employee's medical use of
19 marijuana.
20 (3) Nothing in this chapter may be construed to:
21 (a) prohibit an employer from including in any ~~contract~~ **employment agreement a zero tolerance** provision prohibiting the medical use of OR HANDBOOK
22 marijuana; or
23 (b) permit a cause of action against an employer for wrongful discharge pursuant to 39-2-904 or
24 discrimination pursuant to 49-1-102 based on:
25 (i) an employee's medical use of marijuana ~~in the course and scope of employment~~; or
26 (ii) actions by an employee who was under the influence of medical marijuana ~~in the course and scope~~
~~27 of employment.~~